Radio Systems Technologies Pty Ltd ABN 63 127 549 927
P.O. Box 504, Somerville, 3912, Vic, Australia.
Phone: +613 5978 8011 **Fax:** +613 5978 8022
Email: admin@rstradio.com
Web: www.rstradio.com

The New Smartbridge® Series III Family of Radio Network Interconnect Systems

- **Provides Full Interoperability between otherwise incompatible systems**
- **Links MPT1327, SmartZone, TETRA, P25, LTR and Conventional radio networks harmoniously together, in almost any combination**
- **Surprisingly simple and cost effective concept to extend the coverage of a Trunked system**
- **In-Vehicle Applications, especially important to the Public Safety and Security sectors, provide for continued portable coverage of the main network in places and locations not normally covered by the main network.**
- **Packed with state-of-the-art features: 'DVD' Dynamic Voice Delay ™, extensive signalling facilities, full SDM and other data support, voice announcement, comprehensive Emergency support functions.**

Radio Systems Technologies Pty Ltd ABN 63 127 549 927
P.O. Box 504, Somerville, 3912, Vic, Australia.
Phone: +613 5978 8011 **Fax:** +613 5978 8022
Email: admin@rstradio.com
Web: www.rstradio.com

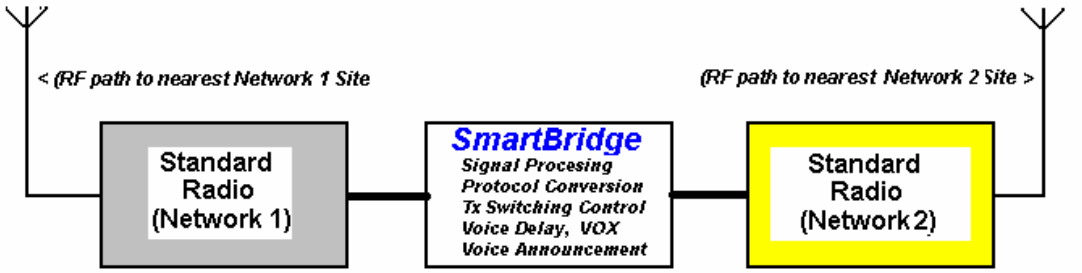
Overview

Smartbridge® is basically an intelligent Cross Band Repeater Controller, using two standard radios (the Network "Gateway Radios") to link two radio networks together. A call is set up between two radios; an Over received on the first radio is transmitted out on the second radio, and vice versa, thus making a Conventional fleet or sub-fleet bi-directionally compatible with a Talkgroup such as TETRA or Smartzone.

System standards covered are MPT1327, SmartZone, TETRA, P25, and LTR. Most inter-system combinations (e.g. TETRA to MPT1327) are readily provided as well, by simple programming changes only.

Since a Trunked system behaves fundamentally differently from a Conventional system, special intelligence and signal processing is necessary, especially in the Call Set Up phase of a call.

Among the protocol standards covered, MPT1327 is the only Message Trunked system, while all other standards are Transmission Trunked based. This requires a fundamentally different approach in the Smartbridge® controller software. All applications are covered by the same hardware but, the programming software has two prime sub programs, one for MPT1327, and one for the remaining (transmission trunked) systems.



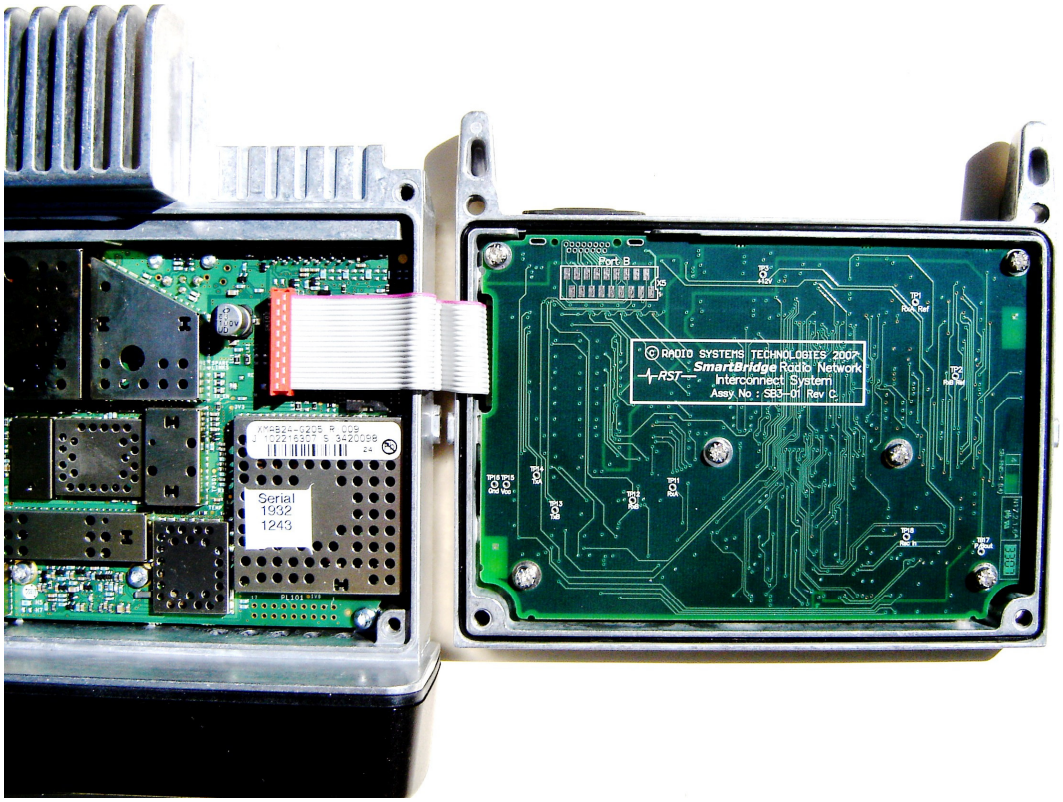
Basic SmartBridge Block Diagram.

The 'Radio Networks' (1 and 2) may be Trunked (MPT1327, TETRA, SmartZone, P25 or LTR), or straight Conventional, in any combination.

Radio Systems Technologies Pty Ltd ABN 63 127 549 927
P.O. Box 504, Somerville, 3912, Vic, Australia.
Phone: +613 5978 8011 **Fax:** +613 5978 8022
Email: admin@rstradio.com
Web: www.rstradio.com

Hardware Executions, Product Contents, Installation

Smartbridge® is available in two different versions, a 19", 1 RU high, 20 cm deep rack mount version designed for fixed applications (pictured on front page), and as a small PCB mobile kit, designed to be fitted into one of the gateway radios or, alternatively, may be fitted in a small enclosure suitable for vehicular installation.



Smartbridge® is fully compatible with most standard Trunked and Conventional radios. Popular choices for the Trunked radios are the Tait TM8200 series for MPT1327 applications, and Motorola radios for SmartZone (MCS2000 and XTL1500/5000 series), TETRA (Motorola TMT500) and LTR versions (GM338 and similar).

In all cases Smartbridge® is delivered complete with programming software and straight radio plug-in cables making for easy, plug-and-play installation. There is no need for additional DC power supplies as DC power is drawn from the gateway radios.

Radio Systems Technologies Pty Ltd ABN 63 127 549 927
P.O. Box 504, Somerville, 3912, Vic, Australia.
Phone: +613 5978 8011 **Fax:** +613 5978 8022
Email: admin@rstradio.com
Web: www.rstradio.com

Operational Applications

- Trunked Coverage Extension ('TalkGroup Extender' mode)

The fixed 19" rack mount version provides for simple cost effective coverage extension of an existing Trunking site. In this case the Smartbridge® usually links a Conventional system to a Trunked system.

The Conventional system may be a standard Repeater system, which is often the preferred option, as it provides local Conventional coverage, as well as Trunked interconnection.

However, the Conventional gateway radio may be a simplex radio as well, for direct mobile to mobile ('talk around') single frequency simplex communications, or if the conventional radio transmits to a remotely located conventional repeater system. Simplex applications usually require the on-board VOX function to be enabled, either on one channel only, or sometimes, on both channels.

When connected (hardwired) to a Repeater, it is sometimes necessary that Smartbridge® takes control over the actual repeater switching and audio turn around functions. The on-board, programmable Repeater Control functions will fully take care of such requirements.

- Message Trunked (MPT1327) System Interconnection

Since the MPT1327 system is message based (i.e. one makes 'calls' to another trunked party of an extended duration, which 'calls' are then to be cleared down again upon completion of the conversation, and a 'new' call set up action is then required for the next call), a means must be provided to signal to the Smartbridge® when an Interconnect call is to be set up. This may be done by a DTMF message (which would enable a conventional caller to call multiple MPT radios from his DTMF keypad), or by sending an on-channel Over but with a different CTSS/PL/DCS tone (fixed MPT call set up only) or, using 5-Tone Selcall (Smartbridge® 's on-board 5-Tone Selcall hardware ensures compatibility with all standard 5-Tone signalling systems).

- Transmission Trunked (SmartZone, TETRA, P25, LTR) Interconnection

The main application for the non-MPT1327 trunked systems (which are basically all Transmission trunked systems) is the "TalkGroup Extender" mode. In this case the Smartbridge® forms a semi-permanent link between the conventional system and the TalkGroup, as there is no need for constant Call Set up and Clear downs messages. Even so, the link may be disabled or enabled as required, by a remote DTMF On or Off command from either a remote TalkGroup radio, or a remote Conventional radio, or both, depending on how the Smartbridge® is programmed. Finally, the call (active state) duration may be made time limited by programming.

- Back-to-Back Trunking Network Interconnection (e.g. MPT to MPT, TETRA to SmartZone, SmartZone to SmartZone)

Most Smartbridge® applications link a conventional network of some kind to a trunked network. However, Smartbridge® may also be used to link two independent trunked systems together, for instance, to give two stand-alone SmartZone sites 'Wide Area' coverage.

Another application is that of providing a migration path from an 'old' Network to a 'new' Network, for instance, when an existing MPT Network is upgraded to a TETRA network. Installation of a Smartbridge® operating in MPT to TETRA mode will provide a gradual migration path to the new standard, avoiding the need for massive and instant fleet cutovers.

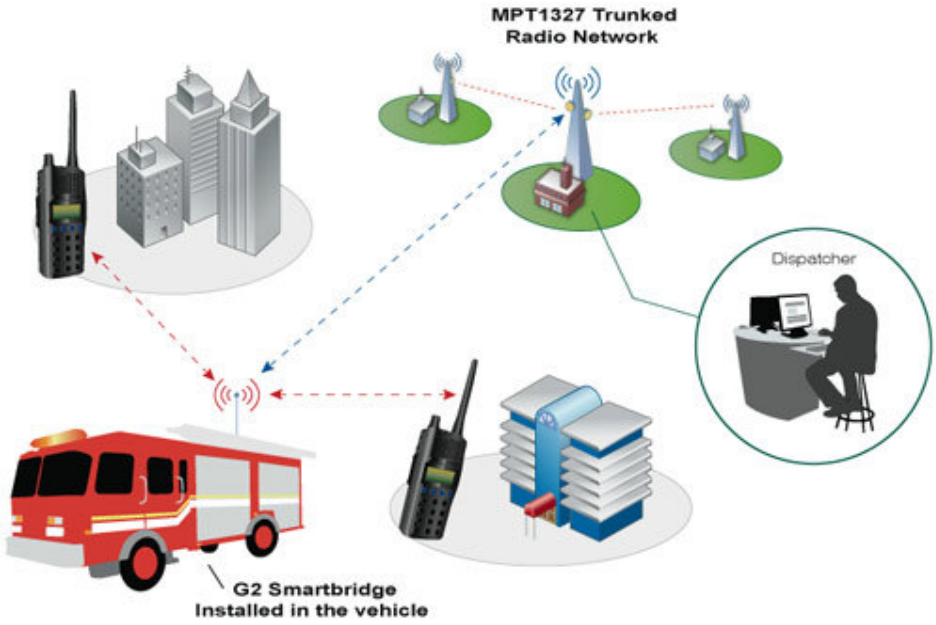
Radio Systems Technologies Pty Ltd ABN 63 127 549 927
P.O. Box 504, Somerville, 3912, Vic, Australia.
Phone: +613 5978 8011 **Fax:** +613 5978 8022
Email: admin@rstradio.com
Web: www.rstradio.com

- Mobile (In-Vehicle Applications)

The mobile version is designed to extend the coverage of the main Trunked system in a local area around the base vehicle, like, inside buildings and basements where there is normally no satisfactory portable coverage. An in-vehicle Smartbridge® system will provide full, transparent extension of the main trunked network coverage to a local area.

The vehicle, already equipped with a trunked radio, is now installed with a second, Conventional radio (ideally with the Smartbridge® mobile kit built in). Officers that need to leave their vehicle for local inspection purposes carry a personal radio, switched to a conventional channel, which keeps them in touch with the trunked network at all times. Emergency facilities such as Man Down, Lone Worker and Alarm messaging remain supported, for instance, a simple button press on the portable may be converted into a Trunked Emergency message, the system can send special pre-coded Data or Status messages to a Control Room in response to specifically coded messages from the portable radio, and so on.

In-vehicle Smartbridge® applications are of particular importance to Public Safety and Security communications.



The diagram shows an example of an in-vehicle Smartbridge® installation that extends the coverage of a Trunked network (in this case an MPT system) in a local area around the base vehicle, to provide continued, transparent Trunked portable coverage into buildings and basements, enabling officers on foot carrying a hand portable radio to stay in radio contact with their Despatcher at all times. The application is particularly important to Public Safety and Security operations. A range of options such as Alarm facilities and Emergency messaging further enhance the operator's safety.